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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,792	03/24/2004	Lichun Leigh Chen	35296US1	4247

116 7590 10/22/2007

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
3726	

MAIL DATE	DELIVERY MODE
10/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/807,792	CHEN ET AL.	
	Examiner	Art Unit	
	Alexander P. Taousakis	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *16-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/24/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Group 1, claims 1-15,21-22 in the reply filed on 7/30/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

The applicant was confused to which species were to be elected. No specific species where pointed out by the examiner, therefore no election of species was required.

The requirement is still deemed proper and is therefore made FINAL.

Specification

The disclosure is objected to because of the following informalities: On page 3, line 2, "addtion" should be changed to –addition--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-15, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maus et al (Pat No. 6,224,691) in view of Jha et al (Pat No. 5,366,139).

Claim 1.

Maus et al teaches a method for making a ferrous metal alloy foil which has a high oxidation resistance and high dimension stability in an automotive exhaust gas atmosphere comprising the steps of:

a) providing a first layer of a first metal material (4) *(see Figure 2)*.

b) sandwiching the first layer of the first material (4) between a first (5) and second layer (6) of one or more second metal material(s) which is different from the first material thereby producing a sandwiched composite; *(see Figure 2 and column 2 lines 7-11)*

d) processing the finished thickness metal composite foil into a honeycomb-like structure having channels for air flow *(see column 2 lines 23-25)*.

e) placing the honeycomb-like structure into a furnace which has been preheated to near or at an annealing temperature, in an air atmosphere, and heating at an annealing

temperature for a period of time which is sufficient to cause diffusion of said one or more second metal materials into said first metal materials to produce a monolithic honeycomb-like annealed alloy foil structure *(see column 2 lines 28-30)*.

f) cooling the furnace and the monolithic honeycomb-like annealed alloy foil structure to room temperature; wherein the one or more of the first metal material or second metal material(s) contains iron *(note that it is inherent the honeycomb element will be cooled to room temperature for packing or for its use onto a motor vehicle)*.

Maus et al fails to teach a step of compaction rolling the sandwiched composite to a finished thickness metal composite foil.

Jha et al teaches a step of compaction rolling a stack composite, wherein the composite comprises a layer of FeCr in between layers of aluminum *(see Figure 2 and column 2 lines 48-58)*, and a step of heat treating the layered composite at a temperature between about 900°C to 1200°C for up to 1 hour.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to compact roll the layered metal sheet of Maus et al, as taught by Jha et al, because it quickly and effectively compresses the layers together to form a uniform connection. Furthermore, it would have been obvious to diffuse the honeycomb element of Maus et al, using the heating parameters of Jha et al, because it forms a composite with superior corrosion and oxidation resistance at high temperature *(see Jha et al column 2 lines 15-19)*.

Claim 2.

Maus et al teaches the method of claim 1, wherein the first metal material comprises Fe and Cr *(see column 2 lines 8-9)*.

Claims 3-4

Maus et al teaches the method of claim 2, but fails to teach a Cr content of about 16 to about 24 wt% and fails to teach a first metal material selected from stainless steel 430, 434, and 446.

Jha et al teaches layer of FeCr, made from stainless steel 430, 434, or 446 with a Cr content of 16 to about 24 wt% *(see Jha et al column 2 line 63)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first layer of Maus et al of stainless steel 430, 434 or 446 with a Cr content of about 16-24 wt%, as taught by Jha et al, because it will provide increased oxygen corrosion resistance *(see Jha et al column 3 lines 7-12)*.

Claim 5.

Maus et al teaches the method of claim 2, wherein the second metal material comprises aluminum *(see Maus et al column 2 line 9)*.

Claim 6.

Maus et al teaches the method of claim 5, wherein the aluminum is essentially pure aluminum or an aluminum alloy *(see Maus et al column 2 line 9)*.

Claim 7.

Maus et al teaches the method of claim 1, wherein the first metal material is FeCr and the second metal material is Al *(see Maus et al column 2 lines 8-10, and note that iron is the main element in steel)*.

Claim 8.

Maus/Jha et al teach the method of claim 7, wherein the furnace is preheated to an annealing temperature and the annealing temperature is from about 900° C to about 1,200° C *(see Jha et al column 3 lines 40-44)*.

Claim 9.

Maus/Jha et al teach the method of claim 8, wherein the period of time for annealing is between about l0 minutes and about 120 minutes *(see Jha et al column 3 lines 43-44)*.

Claims 10-11.

Maus/Jha et al teach the method of claim 9, wherein a monolithic FeCrAl alloy is formed *(see Maus et al column 2 lines 6-11 and column 2 lines 20-25)*, but fails to teach a step wherein a pre-oxidized aluminum surface is formed thereon.

Jha et al teaches a step wherein a pre-oxidized aluminum surface is formed on top of the FeCrAl composite *(see Jha et al column 3 lines 61-64)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a pre-oxidized aluminum surface onto the composite layer of Maus et al, as taught by Jha et al, because it will improve corrosion and oxidation resistance.

Claim 12-13

Maus/Jha et al teach method of claim 7 further, wherein the furnace is heated to an annealing temperature of between about 900° C and 1,200° C within about 30 minutes after the honeycomb-like structure is placed in the furnace and the honeycomb-like

structure is heated, but fail to teach heating for about 2 hours at the annealing temperature *(see Jha et al column 3 lines 38-46)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to anneal the honeycomb structure of Maus et al for about 2 hours because the annealing time directly depends on the thickness of material, and a 2 hour annealing time will diffuse a honeycomb structure of a larger thickness, allowing for a stronger and more rigid structure.

Claims 14-15.

Maus/Jha et al teach the method of claim 13, wherein a monolithic FeCrAl alloy is formed *(see Maus et al column 2 lines 6-11 and column 2 lines 20-25)*, but fails to teach a step wherein a pre-oxidized aluminum surface is formed thereon.

Jha et al teaches a step wherein a pre-oxidized aluminum surface is formed on top of the FeCrAl composite *(see Jha et al column 3 lines 61-64)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a pre-oxidized aluminum surface onto the composite layer of Maus et al, as taught by Jha et al, because it will improve corrosion and oxidation resistance.

Claim 21.

Maus et al teaches a process of making a ferrous metal substrate catalytic converter comprising the steps of: a) providing a first layer of a first material selected from the

group consisting of chromium containing ferrous metals or aluminum containing materials *(see column 2 lines 5-10)*;

b) sandwiching said first layer of said first material between a first and second layer of a second material selected from the group consisting of chromium containing ferrous metals or aluminum containing materials not chosen for the first material thereby producing a sandwiched composite *(see Figure 2 and column 2 lines 7-11)*;

d) processing the finished thickness metal composite foil into a honeycomb-like structure having channels for air flow *(see column 2 lines 23-25)*.

e) placing the honeycomb-like structure into a furnace which has been preheated to near or at an annealing temperature, in an air atmosphere, and heating at an annealing temperature for a period of time which is sufficient to cause diffusion of said one or more second metal materials into said first metal materials to produce a monolithic honeycomb-like annealed alloy foil structure *(see column 2 lines 28-30)*;

f) cooling the furnace and the monolithic honeycomb-like annealed alloy foil structure to room temperature*(note that it is inherent the honeycomb element will be cooled to room temperature for packing or for its use onto a motor vehicle)*;

Maus et al fails to teach a step of compaction rolling the sandwiched composite to a finished thickness metal composite foil and wherein the cooled product of step f) has a pre-oxidized surface comprising Al-oxide.

Jha et al teaches a step of compaction rolling a stack composite, wherein a layer of FeCr is surrounded by layers of aluminum, and a step of forming a layer of aluminum oxide onto the metal surface *(see Figure 2 and column 2 lines 48-58)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to compact roll the layered metal sheet of Maus et al, as taught by Jha et al, because it quickly and effectively compresses the layers together to form a uniform connection. Furthermore, it would have been obvious to form a thin layer of aluminum oxide onto the honeycomb element of Maus et al, as taught by Jha et al, to prevent further oxidation of the honeycomb element, thereby protecting it from weathering or damage *(see Jha et al column 3 lines 67-68)*.

Claim 22.

Maus/Jha et al teach the process of claim 21, wherein the first material is FeCr but fails to teach wherein a second material is pure Al *(see Maus et al column 2 lines 6-11 and column 2 lines 20-25)*.

Jha et al teaches a composite metal foil wherein a first layer is FeCr and the second layer is pure Al *(see Jha et al column 3 line 1)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use pure Al as the second material in the composite foil sheet of Maus et al, as taught by Jha et al, because pure Al has improved oxidation resistance and thermal conductivity as compared to an aluminum alloy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander P. Taousakis whose telephone number is (571) 272-3497. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

APT

DAVID P. BRYANT
SUPERVISORY PATENT EXAMINER

9/20/07